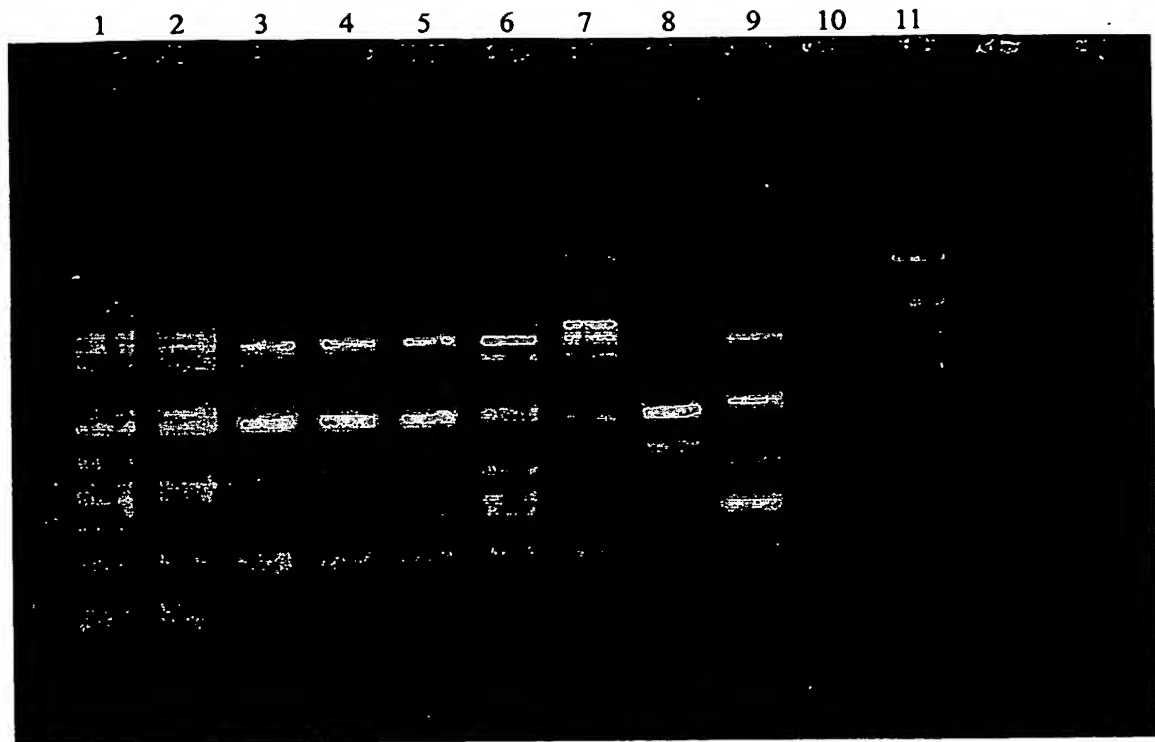


Lane 1 = R  
Lane 2 = HF-51  
Lane 3 = K5054  
Lane 4 = ts-11  
Lane 5 = 6/85  
Lane 6 = F  
Lane 7 = S6  
Lane 8 = A5969  
Lane 9 = Negative  
Lane 10 = Molecular weight marker (Amresco®, 100 BP Ladder, range of fragments (100 bp-3000bp))

**Figure 1**



Lane 1 = HF-51

Lane 2 = K5054

Lane 3, 4, 5 = Unrelated field isolates

Lane 6 = R

Lane 7 = 6/85

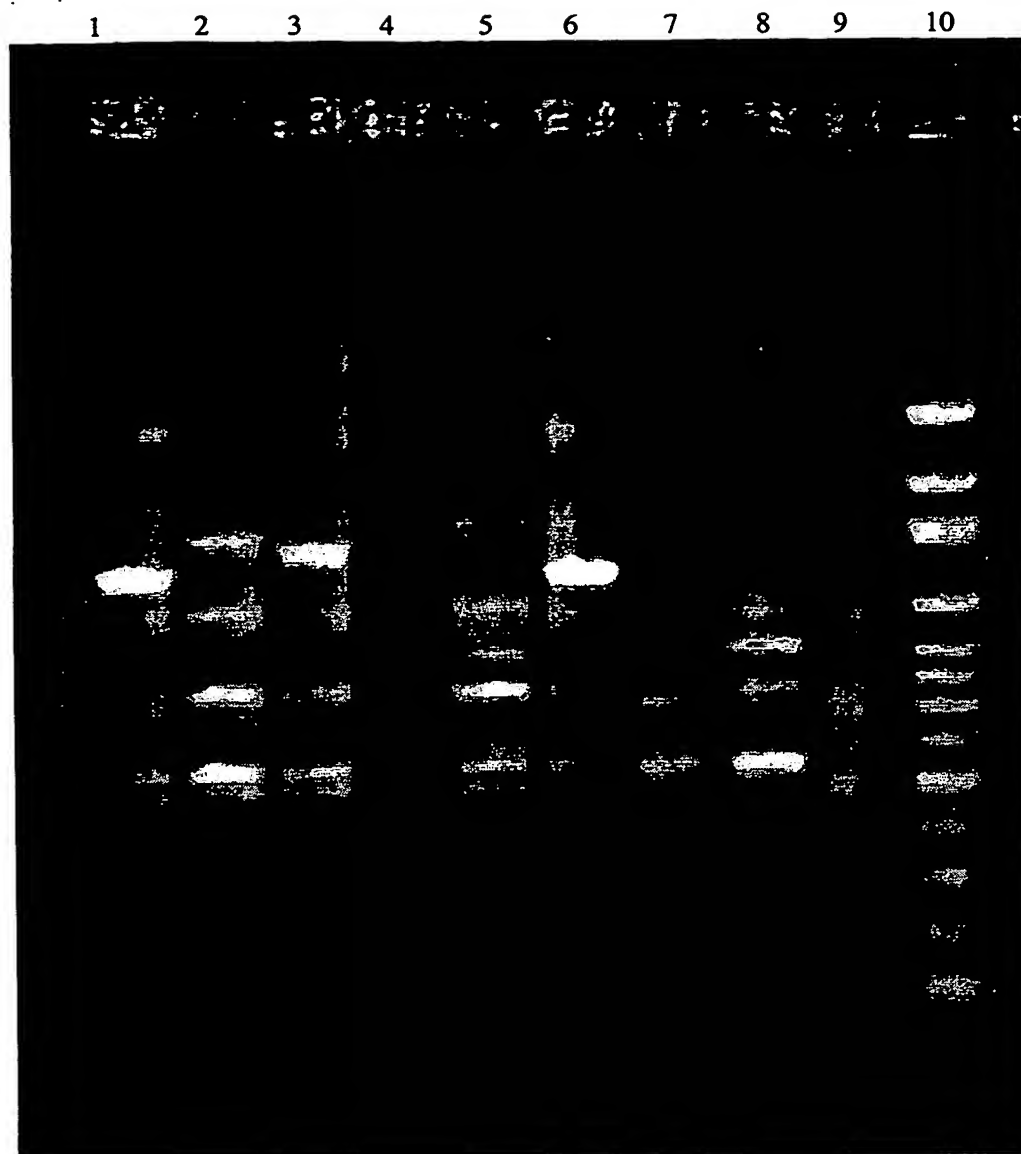
Lane 8 = F

Lane 9 = ts-11

Lane 10 = Negative

Lane 11 = Molecular weight marker (Amresco®, 100 BP Ladder, range of fragments (100 bp-3000bp))

**Figure 2**



Lane 1 = R  
Lane 2 = HF-51  
Lane 3 = K5054  
Lane 4 = ts-11  
Lane 5 = 6/85  
Lane 6 = F  
Lane 7 = S6  
Lane 8 = A5969  
Lane 9 = Negative  
Lane 10 = Molecular weight marker (Amresco®, 100 BP Ladder, range of fragments (100 bp-3000bp))

**Figure 3**

Table 1.1. Bioassay. Serological responses of turkeys at 21, 42, 56, 70 and 84 days postchallenge with K5054 sinus exudate.

Principals (K5054 challenged) and contacts were mixed at 49 days postchallenge.

	SPA								HI				ELISA			
	21	42	56	70	84	21	42	56	70	84	21	42 DPC	56 DPC	70 DPC	84 DPC	
	DPC <sup>A</sup>	DPC	DPC	DPC	DPC	DPC	DPC	DPC	DPC	DPC	DPC					
K5054	7/8 <sup>B</sup> (1.6) <sup>C</sup>	8/8 (2.3)	8/8 (2.9)	7/7 (1.3)	7/8 (1.5)	6/8 (33.6) <sup>D</sup>	4/8 (28.2)	8/8 (61.7)	0/8 (0.0)	4/8 (9.2)	ND	7/8 (0.96 ± 0.56) <sup>E</sup>	8/8 (1.96 ± 1.04)	8/8 (0.96 ± 0.59)	4/8 (0.69 ± 0.90)	
Neg. Controls	0/8 (0.0)	0/8 (0.0)				0/8 (0.0)	0/8 (0.0)				ND	0/8 (0.08 ± 0.03)				
Contacts			0/8 (0.0)	2/6 (0.3)	1/6 (0.2)			0/8 (0.0)	0/6 (0.0)	0/6 (0.0)			0/8 (0.56 ± 0.16)	0/6 (0.03 ± 0.06)	0/6 (0.00 ± 0.00)	

<sup>A</sup> Days postchallenge.<sup>B</sup> No. of positive samples/No. of tested samples (SPA: ≥1, HI: ≥40, and ELISA: ≥ 0.6)<sup>C</sup> Mean agglutination grade (0 to 4).<sup>D</sup> Geometric mean titer.<sup>E</sup> S/P ratio (mean ± standard deviation (SD)); ND=not done**Figure 4**

Table 1.2. Bioassay. Serological responses, lesion evaluation and rate of isolation of *M. gallisepticum* from the trachea and air sacs of principal (K5054 challenged) and contact turkeys 10 days postchallenge with R strain.

Group	Challenge	Serology			Lesions		MG Isolation	
		SPA	HI	ELISA	Air sac score <sup>A</sup>	Mean tracheal mucosa thickness <sup>B</sup>	Trachea	Air sacs
Principals	R	4/4 <sup>C</sup> (2.3) <sup>D</sup>	4/4 (56.6) <sup>E</sup>	4/4 (2.20 ± 1.39) <sup>F</sup>	0/0 (0.0 ± 0.0) <sup>G,a</sup>	14.44 ± 2.68 <sup>a</sup>	0/4 <sup>a</sup>	0/4 <sup>a</sup>
	No challenge	ND	3/4 (33.6)	1/4 (0.55 ± 0.27)	0/0 (0.0 ± 0.0) <sup>a</sup>	13.25 ± 1.97 <sup>a</sup>	0/4 <sup>a</sup>	0/4 <sup>a</sup>
Contacts	R	3/3 (2.7)	3/3 (160.0)	3/3 (2.31 ± 0.30)	3/3 (4.0 ± 0.0) <sup>b</sup>	31.25 ± 1.39 <sup>b</sup>	3/3 <sup>b</sup>	3/3 <sup>b</sup>
	No challenge	ND	0/3 (0.0)	0/3 (0.04 ± 0.01)	0/0 (0.0 ± 0.0) <sup>a</sup>	14.33 ± 0.63 <sup>a</sup>	0/3 <sup>a</sup>	0/3 <sup>a</sup>

<sup>A</sup> Macroscopically scored from 0 to 4

<sup>B</sup> Mean thickness for the group in units. 1 unit = 0.0083mm

<sup>C</sup> No. of positive samples/No. of tested samples (SPA: ≥1, HI: ≥40, ELISA: ≥0.6, Air sac score ≥1)

<sup>D</sup> Mean agglutination grade (scored from 0 to 4).

<sup>E</sup> Geometric mean titer.

<sup>F</sup> S/P ratio (mean ± SD)

<sup>G</sup> Mean score ± SD; <sup>a,b</sup> Values within a column with a different lower case superscript are significantly different ( $P \leq 0.05$ )

**Figure 5**

Table 2.1. Safety. Serological responses of chickens postvaccination/challenge with ts-11, K5054 and R at 3 weeks of age

Vaccine/ Challenge	SPA		HI		ELISA	
	10 DPV <sup>A</sup>	35 DPV	10 DPV	35 DPV	10 DPV	35 DPV
TS-11	2/16 <sup>B</sup> (0.1) <sup>C</sup>	8/10 (2.4)	0/16 <sup>D</sup> (0.0)	1/10 (11.8)	0/16 <sup>E</sup> (0.80 ± 0.01)	7/10 (0.86 ± 0.86)
K5054	2/16 (0.1)	10/10 (3.0)	0/16 (0.0)	3/10 (24.6)	1/16 (0.33 5.08)	3/10 (0.32 ± 0.19)
R	15/15 (3.0)	N/A	5/15 (20.6)	N/A	11/15 (0.87 ± 0.73)	N/A
Neg. Controls	0/16 (0.0)	0/5 (0.0)	0/16 (0.0)	0/5 (0.0)	0/16 (0.44 ± 0.01)	0/5 (0.19 ± 0.01)

<sup>A</sup> Days postchallenge.<sup>B</sup> No. of positive samples/No. of tested samples (SPA: ≥1, HI: ≥40, and ELISA: ≥ 0.6)<sup>C</sup> Mean agglutination grade (0 to 4).<sup>D</sup> Geometric mean titer.<sup>E</sup> S/P ratio (mean ± standard deviation (SD)); N/A - not applicable**Figure 6**

Table 2.2. Safety. Lesion scores and rate of *M. gallisepticum* isolation from chickens 10 days postvaccination/challenge with ts-11, K5054 and R at 3 weeks of age.

Vaccine/Challenge Strain	Air Sac Lesion Score <sup>A</sup>	Mean tracheal mucosal thickness <sup>B</sup>	MG Isolation	
			Trachea	Air sacs
TS-11	0/16 <sup>C</sup> (0.0 ± 0.0) <sup>D,a</sup>	6.38 ± 1.77 <sup>a</sup>	1/16	0/16
K5054	0/16 (0.0 ± 0.0) <sup>a</sup>	5.94 ± 1.77 <sup>a</sup>	16/16	6/16
R	12/15 (1.8 ± 1.15) <sup>b</sup>	42.75 ± 1.83 <sup>b</sup>	15/15	15/15
Neg. Controls	0/16 (0.0 ± 0.0) <sup>a</sup>	6.23 ± 1.77 <sup>a</sup>	0/16	0/16

<sup>A</sup> Macroscopically scored from 0 to 4

<sup>B</sup> Mean thickness for the group in units. 1 unit = 0.0083mm

<sup>C</sup> No. of positive samples/No. of tested samples (Air sac score ≥ 1)

<sup>D</sup> Mean score ± SD

<sup>a,b</sup> Values within a column with a different lower case superscript are significantly different ( $P \leq 0.05$ )

**Figure 7**

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Table 2.3. Safety. Serological responses, lesion scores and rate of *M.gallisepticum* isolation from turkeys 10 days post vaccination/challenge with K5054 and R at 4 weeks of age.

Group	Serology			Lesions <sup>a</sup>		MG Isolation	
	SPA	HI	ELISA	Air Sac Lesion Score <sup>A</sup>	Mean tracheal mucosal thickness <sup>B</sup>	Trachea	Air sacs
K5054	0/15 <sup>C</sup> (0.0) <sup>D</sup>	0/15 (0.0) <sup>E</sup>	0/15 (0.44 ± 0.01) <sup>F</sup>	2/15 (0.2 ± 0.7) <sup>G,a</sup>	12.77 ± 2.52 <sup>a</sup>	15/15	13/15
R	15/15 (3.1)	0/15 (2.2)	3/15 (0.24 ± 0.49)	13/15 (2.2 ± 1.3) <sup>b</sup>	20.87 ± 4.36 <sup>b</sup>	15/15	15/15
Neg. Controls	0/14 (0.0)	0/14 (0.0)	0/14 (0.68 ± 0.05)	0/14 (0.0 ± 0.0) <sup>a</sup>	8.29 ± 1.02 <sup>a</sup>	0/14	0/14

<sup>A</sup> Macroscopically scored from 0 to 4

<sup>B</sup> Mean thickness for the group in units. 1 unit = 0.0083mm

<sup>C</sup> No. of positive samples/No. of tested samples (Air sac score ≥ 1, SPA: ≥1, HI: ≥40, and ELISA: ≥ 0.6)

<sup>D</sup> Mean agglutination grade (0 to 4).

<sup>E</sup> Geometric mean titer.

<sup>F</sup> S/P ratio (mean ± standard deviation (SD))

<sup>G</sup> Mean score ± SD

<sup>a,b</sup> Values within a column with a different lower case superscript are significantly different ( $P \leq 0.05$ )

**Figure 8**



Table 3.1. Efficacy. Experiment 2. Serological responses of chickens 10 days post challenge with R strain of MG.

Group	Challenge	Serology			Lesions		MG Isolation	
		SPA	HI	ELISA	Air Sac Lesion Scores <sup>A</sup>	Mean tracheal mucosal thickness <sup>B</sup>	Trachea	Air sacs
TS-11	R	38/38 <sup>C</sup> (4.0) <sup>D</sup>	37/38 (43.8) <sup>E</sup>	38/38 (4.64 ± 1.06) <sup>F</sup>	17/38 (0.7 ± 1.0) <sup>G,a</sup>	16.32 ± 19.27 <sup>a</sup>	38/38	33/38
	No challenge	9/9 (3.8)	0/9 (20.0)	8/9 (1.33 ± 0.75)	0/9 (0.0 ± 0.0) <sup>b</sup>	7.28 ± 1.77 <sup>a</sup>	5/9	0/9
K5054	R	39/39 (4.0)	32/39 (37.3)	39/39 (2.88 ± 1.14)	13/39 (0.4 ± 0.5) <sup>a</sup>	8.88 ± 2.91 <sup>a</sup>	39/39	36/39
	No challenge	10/10 (4.0)	1/10 (15.9)	10/10 (1.32 ± 0.44)	0/10 (0.0 ± 0.0) <sup>b</sup>	7.50 ± 1.72 <sup>a</sup>	10/10	0/10
No Vaccine	R	40/40 (4.0)	33/38 (36.5)	40/40 (3.38 ± 1.02)	40/40 (2.9 ± 0.4) <sup>c</sup>	57.23 ± 22.17 <sup>b</sup>	40/40	40/40
	No challenge	0/32 (0.0)	0/32 (0.0)	0/32 (0.13 ± 0.05)	0/32 (0.0 ± 0.0) <sup>b</sup>	6.94 ± 1.42 <sup>a</sup>	0/32	0/31

<sup>A</sup> Macroscopically scored from 0 to 4<sup>B</sup> Mean thickness for the group in units. 1 unit = 0.0083mm<sup>C</sup> No. of positive samples/No. of tested samples (Air sac score ≥ 1, SPA: ≥ 1, HI: ≥ 40, and ELISA: ≥ 0.6)<sup>D</sup> Mean agglutination grade (0 to 4).<sup>E</sup> Geometric mean titer.<sup>F</sup> S/P ratio (geometric mean ± standard deviation (SD))<sup>G</sup> Mean score ± SD<sup>a,b</sup> Values within a column with a different lower case superscript are significantly different ( $P \leq 0.05$ )Figure 9

Table 3.2. Efficacy. Serological responses, lesion scores and rate of isolation of *M. gallisepticum* from turkeys 10 days post challenge with R strain at 6 weeks post vaccination.

Group	Serology			Air Sac Lesion Scores <sup>A</sup>	Mean tracheal mucosal thickness <sup>B</sup>	MG Isolation	
	SPA	HI	ELISA			Trachea	Air sacs
K5054	18/18 <sup>C</sup> (1.3) <sup>D</sup>	1/18 (2.4) <sup>E</sup>	17/18 (1.57 ± 0.67) <sup>F</sup>	12/18 (1.4 ± 1.3) <sup>G,a</sup>	13.90 ± 2.10 <sup>a</sup>	14/18	11/18
Challenged Controls	20/20 (2.0)	18/20 (47.0)	20/20 (1.27 ± 0.49)	20/20 (3.8 ± 0.4) <sup>b</sup>	22.06 ± 3.46 <sup>b</sup>	20/20	20/20
Negative Controls	0/20 (0.0)	0/20 (0.0)	0/20 (0.13 ± 0.05)	0/20 (0.0 ± 0.0) <sup>a</sup>	13.55 ± 2.00 <sup>a</sup>	0/20	0/20

<sup>A</sup> Macroscopically scored from 0 to 4; <sup>B</sup> Mean thickness for the group in units. 1 unit = 0.0083mm

<sup>C</sup> No. of positive samples/No. of tested samples (Air sac score ≥ 1, SPA: ≥ 1, HI: ≥ 40, and ELISA: ≥ 0.6)

<sup>D</sup> Mean agglutination grade (0 to 4); <sup>E</sup> Geometric mean titer.

<sup>F</sup> S/P ratio (geometric mean ± standard deviation (SD)); <sup>G</sup> Mean score ± SD

<sup>a,b</sup> Values within a column with a different lower case superscript are significantly different ( $P \leq 0.05$ )

**Figure 10**

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